

## **Finite Element Analysis of the Microisolation Valve**

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Finite element analysis has been used to assist the design and development of the microisolation valve by analyzing and characterizing the device. The valve is a small, electrically-actuated, one time-opening valves for turning on small flow of pressurized gasses. This MEMS-based valve, fabricated mostly from silicon, is designed to replace the larger pyrotechnically actuated valve. A channel is etched into the silicon substrate with a doped silicon plug placed at one location along the channel to obstruct flow. The valve is opened by supplying a sufficient amount of electrical power, via a deposited conductive trace, to melt or vaporized the plug. Finite element analysis was conducted on different silicon thicknesses to model the transient heat profile as the actuation current is applied, and to obtain a thermally induced stress profile from the heating. The thermal steady state results were used to determined the amount of power required to melt the silicon barrier.